gram of the white of egg above described. A number of trials were made, and the results proved this to be so.

Additional confirmation was afforded by the results obtained in some other cases:

In Case X of Table IV the 10 c.c. were not able to digest the 10 centigrams entirely; a few minute particles remained over, and allowing the beakers to remain in the thermostat for four or five hours more than the normal time did not change the result; but 5 centigrams was digested by 10 c.c. in three and one-half hours, two hours less than the normal time. It was clearly apparent, therefore, that though the 10 c.c. was not quite equal to 10 centigrams (in other words 1 c.c. to 1 centigram), it was more than equal to 5 centigrams (or 1 c.c. to more than 0.5 centigram). If more filtrate had been left the examination could have been continued until the exact limit for quantity had been reached; judging by what was left over on the first trial, I should say that this would have been about 9 to 9.5 centigrams.

F. A. G., reaction to blue litmus +	6 centigrams in 6 c.c. after 9 hours 15 minutes, edges only slightly thinned.
reaction to Congo +	6 centigrams in 6 c.c. + HCl (c. p.) gtt. ii. Complete digestion in five hours.
Filtered, reaction to Congo —	

Here, when we have the pepsin activated by the addition of HCl, we get a striking verification of our proposition. It can, therefore, be said that the normal quantity of pepsin in the ordinary normal stomach is equivalent to the digestion by each cubic centimeter of the gastric juice of 1 centigram of white of egg, prepared as above described, in from five to five and one-half hours.

ADENOFIBROMA OF THE MALE BREAST.

By R. T. Woodyatt, B.S. M.D.,
of Chicago.

(From the Pathologic-Anatomical Institute of the University of Strassburg,
Prof. Chiari, Director.)

In March, 1907, there was sent to the laboratory a tumor mass which had been extirpated from the breast of a boy. This was put into my hands for study by Prof. Chiari. It had a fibro-epithelial structure corresponding to that of ordinary adenofibroma, such as may occur in the female breast. In attempting to ascertain the frequency of such growths in the male breast some difficulty was encountered, because of the uncertainty which still prevails in the literature regarding the use of terms covering a group of affections of the male breast, all of which are fibro-epithelial in structure. Thus the terms adenofibroma, gynecomastia, adolescent tumor, mastitis, etc., are applied by different writers to the most variable affections. This seems to be due to a lack of data concerning the finer structure of the affections in question, a lack due in its turn to scarcity of pathological material, because all of these affections are uncommon and of such nature that they seldom demand surgical treatment.

A second case like the first one appeared in one of the surgical clinics a few weeks later, and Prof. Chiari then unearthed from the museum specimens representing five more cases of the same general group. With this rather unusual material at hand, it was thought worth while, in view of the afore-mentioned considerations, to record the findings and make them the basis for a comparative study of the members of the group of non-malignant fibro-epithelial tumors which affect the male breast.

Case I.—(The history was provided by the physician in charge of the case, Dr. Schaller, of Barr, in Alsatia.) Alphonse S., aged fifteen years, a gardener's apprentice, had always been well until one year ago. At this time he noticed a lump the size of a bean under the left nipple, and a few weeks later a similar enlargement under the right. Both were painful and grew quite rapidly until they reached the size of hazelnuts. After four to six weeks they disappeared spontaneously. Toward the end of January, 1907, about a year later, a new tumor appeared under the left nipple. This increased steadily in size, becoming more and more painful until the patient sought the advice of a doctor. He complained then of pain in the left breast which was increased when pressure was made over the areola. There was no history of traumatism.

Physical Examination. The patient is a very thin, lightly built, but healthy looking boy. All organs are normal except the breast. Under the left nipple is an elongated mass, 6 to 8 cm. long and 3 to 4 cm. broad, its long axis extending toward the axilla. Its consistence is firm, its surface somewhat knobbed; it can be moved freely on the underlying structures. The overlying skin is not adherent. The papilla itself, however, is fixed to the mass. There is marked tenderness on pressure. The right breast is normal. A potassium iodide salve was prescribed. February 26 (four weeks later): The breast is more painful. Two bean-sized glands are now palpable in the axilla of the affected side. A compression bandage applied. March 11: The tumor has increased somewhat in size and is still more painful. Extirpation of the mass together with the nipple under local anesthesia. Rapid healing. March 19: The patient reports that he is free from symptoms. Since this time there has been no recurrence.

Macroscopy. The tissue sent to the laboratory in alcohol and formaldehyde consists of a flat, dense, whitish disk (2.5 to 3.0 cm.

broad, 0.5 to 0.8 cm. thick. Its surface is smooth but somewhat knobbed, with all evidence to show that it had been sharply defined from the surrounding tissues. Its cut surface is white with small punctate or linear markings corresponding to gland ducts. These radiate downward and outward from the region of the papilla to the periphery of the disk.

Microscopic examination shows a predominance of fibrous stroma arranged in broad trabeculæ, which support in their interspaces glandular structures (Fig. 2). The latter consist of gland ducts cut in various directions, and their acinus-like terminals. The large ducts are nearly all dilated and show great irregularity of form due to projections of the walls into the capacious lumens. These projections are sometimes purely epithelial; more often they appear to be caused by invaginations of the surrounding stroma. Where both processes combine, true papillary structures are produced (as pictured in Fig. 4 from Case II). The lumens are generally empty. A few contain scattered epithelial cells, clear serum-like fluid, or detritus. Lining the lumens four to six irregular layers of epithelial cells may often be found, while at times, as above noted, solid epithelial projections occur, leaving no doubt that genuine proliferation of these cells has taken place. The ducts after three to four bifurcations terminate in groups of end-sacs analogous to those seen in the breast of a non-parous girl. They vary in number from two to eight in a group. The epithelium everywhere rests on a basement structure which is usually thickened. This membrane is not always "structureless" as Kölliker[1] observes for normal glands. Favorable sections show plainly that it is made up of very long, narrow cells laid in imbricated series and apparently analogous to the layer of myo-epithelium which occurs in sweat glands. Outside of the basement structure comes the fibrous stroma. This is moderately vascular and well supplied with nuclei which stain deeply. (For comparison of stroma with that of the normal gland of a fifteen-year-old male, see Figs. 1 and 2.) In the zones immediately adjacent to the gland structures one notices even greater cell richness and vascularity than elsewhere, also occasional plump cells with large oval nuclei like young connective tissue cells. (These are pictured from Case II, in Fig. 4, D.) The close proximity of these to the thickened basement structure and the occurence of large cells in the latter make it difficult to tell where stroma leaves off and basement structure begins. In hemalum- or hematoxylin-stained specimens the periglandular zones are rendered conspiciously blue owing to the presence there of a fluid which takes that color. Blue zones are especially marked about the terminals and finer ducts of the glands where the parenchymatous parts are invested in loose-meshed areolar tissue mantels which fill the interspaces between the firm stroma and the epithelial structures. The acini and fine ducts appear then to be surrounded by myxomatous tissue. The fluid, however, gives no characteristic color reactions when stained for mucin or for fibrin. In adenofibroma of the female breast Ribbert refers to it as more in the nature of œdema. There are no collections of round cells. Elastic tissue is not demonstrable except in the bloodvessels. Fat tissue occurs peripherally in narrow islands

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[1] Beiträge zur Kenntnis der Brustdrüse. Verhandl. der physikalisch-medizinischen Gesellschaft in Würzburg. 1880, xiv.

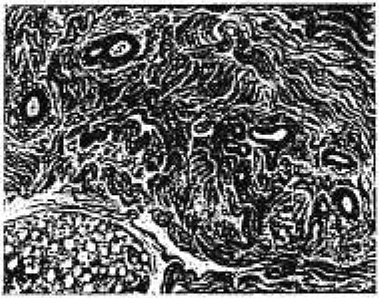

FIG. 1.—Normal breast from a fifteen-year-old boy dead of pneumonia. To show the nature of the normal stroma and epithelium. (Zeiss ocular 4, objective AA.)

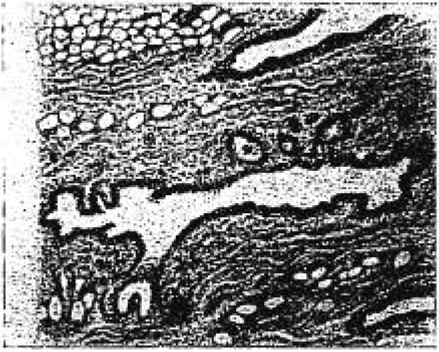

FIG. 2.—Case I. Shows dense rich stroma and proliferated epithelium. (Zeiss ocular 4, objective AA.)

parallel to the fiber course. Centrally one sees single fat cells or small collections of them.

Diagnosis. The following affections require consideration:

I. Simple inflammation (mastitis).
II. Gynecomastia.
III. Neoplasm (adenofibroma).
IV. Adolescent tumor ("mastitis adolescentium," etc.)[2]

I. Mastitis. There are no evidences of simple acute inflammation. There is no marked vascular engorgement, no cellular nor fibrin-containing exudate. The mass as a whole, was sharply circumscribed. The only feature suggesting inflammation in any way was the enlarged axillary gland. The great difficulty that may arise in trying to differentiate chronic inflammation from tumor in the breast in general is recognized. It has been emphasized by Billroth,[3] Borst,[4] Ribbert,[5] Fabian[6] and others. In this case nothing points unequivocally toward inflammation in the ordinary sense.

II. Gynecomastia. This term, originated by Paul d'Egine, which has been loosely applied to nearly every disease to which the male breast is heir, refers literally to cases in which a male possesses a breast or breasts like those of a woman. Lack of pathological material for accurate study due to the rarity of the affection[7] and its mild nature, which only exceptionally demands surgical treatment, has been responsible for confusion as to its relationship to other diseases of the male breast and misconception as to the degree of real similarity which can exist between male and female breasts in general. Before proceeding with the differential diagnosis, I shall attempt to define clearly what the term gynecomastia properly embraces.

It was at one time supposed and still often stated that such glands can secrete milk.[8] The case of a man who suckled his own child continually recurs in the literature. The weight of scientific evidence is all against such occurrences. No case is on record in which the secretion of milk has been verified by chemical tests,[9] the reports of milk secretion having arisen through the not infrequent observation of whitish fluids expressible from the nipple which on exact examination have proved to be cystic, purulent, or serous. Further, no careful microscopic examination of the male breast has ever demonstrated acini of the type which occur in a breast which has functionated. A true resemblance between a mature female mamma and that of a male, therefore, does not exist. However, the finer structure of a virgin female breast differs little from that of the male. Let a male breast develop sufficiently in size, and it may truly resemble a nulliparous female breast.[10] Such an enlargement constitutes gynecomastia. It may occur as one manifestation of a general feminine tendency, and be accompanied by other anomalies, such as high voice, female distribution of hair, etc.; it may be associated with cryptorchism, hypospadias, hermaphroditism, and many other anomalies of the genitalia; it may follow removal of the testicles even late in life, or occur in the course of diseases, such as carcinoma, which destroy these organs; or, finally, it may be an apparently isolated anomaly occurring in otherwise healthy men of strong masculine habitus. It may be unilateral or bilateral.

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[2] Peculiarities of the normal male breast capable of confusion with disease processes are thoroughly treated by Gruber, Luschka, Kölliker, and Langer.

[3] Die allgemeine chirurgische Pathologie und Therapie, 1893, 902.

[4] Die Lehre der Geschwülste.

[5] Lehrbuch der speziellen Pathologie, 1902, 564.

[6] Die Bindegewebshyperplasie im Fibrom und im Fibroadenom der Mamma, Arch. f. klin. Chirurgie, lxv.

[7] According to Duplay and Reclus, only one case was found by Peuch in the course of the examination of 13,000 conscripts.

[8] Lydston, Jour. Amer. Med. Assoc., December 12, 1908, makes this statement again apropos of an article by Gellhorn concerning Abnormal Secretions from the Mammary Glands in Non-pregnant Women (same Journal, 1908, li, 1839).

[9] A simple chemical test is to demonstrate the presence of lactose. The poorest true milk contains a percentage of lactose not approached by any other body fluid. If the de-albuminised fluid reduces the ordinary copper solutions, but fails to show fermentation with yeast, lactose is probably present. Further proof of lactose would be afforded by precipitation of phenyl-lactosazon in the usual manner of osazon preparation, separation of the crystals, and determination of their melting point.

The histology of such glands has been accurately studied in only a few cases (Volkman,[11] Stieda,[12] Israel,[13] Scheiber[14]). Apart from slight differences in their findings, which might have been due to differences in the age of the disease or to the presence or absence of slight superposed pathological processes, such as inflammations, these authors agree in assigning to such glands the structure of hypertrophic male breasts. They are anomalies of growth.

It must be remembered that a hypertrophic male breast is subject to disease. Owing to the nature of a man's pursuits it is more likely to suffer from traumatism than a female breast of the same size. Failure to discriminate between "healthy" and "diseased" gynecomastias has led to many doubtful statements regarding their characteristics, both pathological and clinical. A hard, dense breast is never pure gynecomastia, nor are simple gynecomastias "exquisitely tender" nor painful any more than normal female breasts. Histological reports bearing on such complicated cases have little value. (For examples, see Gaillet,[15] Reny,[16] Baillet,[17] Kauffmann.[18])

Limiting the term gynecomastia, then, to hypertrophies of the male breast, such as may occur as independent anomalies early in life, or as accompaniments of other signs of female habitus, such as feminine voice, female hair distribution, etc., or in association with cryptorchism, hypospadias, hermaphroditism, or other anomaly of the genital tract, or such hypertrophy as may occur at any time as a result of castration or disease which destroys the testicles, we may say that the specimen under consideration is not gynecomastia. It differs in that it was painful and tender from the outset. The mass was sharply circumscribed and dense. Under the microscope the stroma is seen to be rich and active, the epithelium to be in a marked state of proliferation.

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[10] Provided, of course, the nullipara had never secreted true milk. For a discussion of milk secretion by virgins, see Gellhorn, loc. cit., footnote 1.

[11] In Schuchardt's Collection.

[12] Beitrag zur hist. Kenntnis der sog. Gynäkomastie, Beiträge zur klin. Chir. (Bruns), 1895, xiv, 179.

[13] Zwei Fälle von Hypertrophie der männlichen Brustdrüse, Inaugural Dissertation, Berlin, 1894.

[14] Einige angeborene Anomalien beobachtet im path. anat. Inst. zu Bukarest, No. 7 in Med. Jahrbücher von der k. k. Gesellschaft, Wien, 1875, p. 261.

[15] Soc. de biol., 1850.

[16] Thèse de Velpeau, Paris, 1880, p. 35.

[17] Bull. de la soc. anat., 1890, p. 532.

[18] Lehrbuch der spez. path. Anat., 1904, p. 955.

These observations were controlled by comparison with a genuine case of gynecomastia which Prof. Chiari kindly lent from his private collection, and also by comparison with a second case of gynecomastia herein described (Case VII). It may be stated here that these cases confirm the findings of Stieda, Israel, and others.

III. Adenofibroma. The density, circumscription, and histological structure tally closely with those of an ordinary adenofibroma, such as may occur in the breast of a young woman. The symptoms and course also offer nothing incompatible with such. The only difficulty is encountered when one attempts to make such a diagnosis fit in with the clinical facts which have been published concerning that affection known as "mastitis adolescentium," which also closely resembles this case, but which is supposedly a self-limited affection, it being alleged that most cases recover spontaneously. Further discussion will follow a short presentation of the facts concerning this latter disease.

IV. Adolescent Tumor. (Mastitis adolescentium, mastitis pubescentium virilis, Albers.[19] Areolar and mammillary tumor, Cooper.[20]) Hochenegg[21] says: "Mastitis adolescentium constitutes an inflammation of problematical etiology which affects the mammary glands of young men." The observed characteristics of the disease will be evident from the following citations taken mainly from Schuchardt's[22] review of male breast affections.

C. Langer[23] states: "At puberty there very often occurs a dull, easily borne pain in the breast, during which time the organ enlarges somewhat, the nipple projects, and the areola becomes deeply pigmented or even reddened. After two to three weeks all symptoms disappear, but the nipple may remain prominent from that time forth." This is common knowledge. Severer cases may be marked by exaggeration of the pain and prolongation of the course. Albers found the gland enlarged in the form of "a flat hard callus" lying behind the nipple and tender on pressure.

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[19] Mastitis pubescentium virilis, Med. Korrespondenzbl. Rhein. und Westphäl-Aerzte 1843, No. 13.

[20] Lectures on Surgery, 1836.

[21] Lehrbuch der spez. Chir., 1907, i, 869.

[22] Ueber die Vergrösserungen der männlichen Brüste, Langenbeck's Archiv, 1885, xxxi, 159.

[23] Ueber den Bau und die Entwickelung der Milchdrüse bei beidern Geschlechtern. Denkschrift der Kais. Akad. der Wissens. (math. wissens. Klasse), 1852, iii.

A case of Lauenstein's[24] reported by Schuchardt ran as follows: The patient, aged twenty-six years, entered the hospital, October 13, 1884, on account of a tumor in the left breast which had developed within five months. No history of syphilis or traumatism. The tumor had never been painful until about the time he sought medical advice. The region of the left breast bulged somewhat. The centre of the left mamma was occupied by a flat tumor the size of a 5-mark piece which seemed not to be fixed either to the skin or to the pectoralis. No pain on pressure. . . . The patient had in each axilla an enlarged freely movable lymph gland, and on the right side a swollen cubital gland. Extirpation October 14. The tumor included the centre of the gland; it was the size of a 5-mark piece and 1 cm. thick. In substance it was dense like a fibroma and sharply defined from its surroundings. On cut surface it looked grayish white. . . . Examination of sections made after hardening showed excessive amounts of connective tissue ground substance, in which gland tubules were here and there introduced and in which in addition there occurred numerous smooth-walled irregular cavities which gave the whole section the appearance of being perforated like Swiss cheese. The vascular development in the tumor was not very rich. The diagnosis *fibro-adenoma cysticum*, herewith made, was confirmed by Prosector Dr. Fränkel, of Hamburg. The patient had no further trouble. Schuchardt looks on this case as one of adolescent mastitis.

Stümcke states that the disease lasts until adult life is established; that its course will be shorter the less time there remains before that event. He never saw a case that did not get well spontaneously.[25]

Risel[26] also reports a case like Lauenstein's, in which the tumor was much larger but nevertheless disk-shaped, attached to the nipple, otherwise free, sharply circumscribed, dense, etc. Risel says he too has seen other cases of the disease, but never had to operate except in this instance.

Such cases as Lauenstein's and Risel's are undoubtedly instances of the same disease as Case I. They were also looked upon by the writers as identical, for a time at least, with adolescent mastitis. If such cases as these were capable of spontaneous healing like the rest, it would be difficult to think of them as tumors, in spite of their structural resemblance to adenofibroma. But it will be noticed that those cases which were operated upon and showed tumor structure had already demonstrated clinically that they were different from the ordinary adolescent mastitis, and were operated upon for this very reason, that is, their lack of self-healing tendencies.

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[24] In Schuchardt's Collection, loc. cit.

[25] It has also been said that onanists and those who have exercised the sexual function are seldom affected.

[26] In Schuchardt's Collection, loc. cit.

Microscopic examinations have never been made in such cases as get well by themselves. If made, it is probable that the picture would be found to differ from that of such cases as Case I. This unknown picture would be that of adolescent mastitis.

Briefly summarized, Case I is an instance of adenofibroma in the male breast. What "adolescent mastitis" is, we do not know. Case I throws no new light on it, unless it be taken to show that "adolescent mastitis" may occasionally give rise to true adenofibroma.

A review of available literature made for the purpose of learning how frequent these cases of adenofibroma are, showed that while malignant tumors occur in the male breast about one-fiftieth as often as in the female breast, and are hence not extremely rare, non-malignant neoplasms (in which we do not include adolescent tumor) occur much less frequently. Pure undoubted adenoma has been reported three times only (Römer[27]), and one of these reports was suggestive of carcinoma. As stated at the beginning of the paper, reports of "adenofibroma" have included many sorts of affections, so that it is difficult to judge of their frequency. Some half-dozen cases in the literature had characteristics which made it evident they were identical with the one in hand. But probably they are commoner than the literature indicates.

Case II.—Museum specimen 3923, dated June 10, 1902. Histological Protocol 1756, Dr. Boeckel.

Clinical History. Edward S., aged ten years, was first examined by Dr. B., June 6, 1902. The mother said that a tumor began in the left mamma eight months before, and that recently it had begun to grow larger (no mention is made of pain). Examination showed a tumor in the upper part of the left mamma the size of a small apple. The nipple protruded. Axillary glands not enlarged. Clinical diagnosis adenoma. Extirpation June 10. Complete healing of wound. No recurrence after four years.

The tissue consists of a roughly oval disk with one surface a little concave, the other convex. Dimensions, 8.5 x 5 x 2 cm. The surfaces are everywhere smooth, in places slightly knobbed. All signs point to a sharp circumscription. The cut surface is marked by connective tissue trabeculæ, which subdivide the whole into small irregular areas in which the tissue is darker and more opaque than the rest, corresponding to ducts and terminals.

Microscopic examination shows trabeculæ of relatively dense connective tissue provided with numerous, fairly plump nuclei, and moderate numbers of bloodvessels (Figs. 3 and 4). Fat tissue occurs in the stroma as long islands running parallel to the course of the fibers and as single fat cells or small clusters of the same. The glandular parts show the same characteristics as those seen in Case I, except that in this case the acini are better developed, groups of eight, ten, and twelve being not uncommon. These are larger than those seen in Case I, though not like those of a functionating female breast. The glands are surrounded by the same blue-stained mesh containing numerous young connective-tissue

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[27] Inaugural Dissertation, München, 1880.

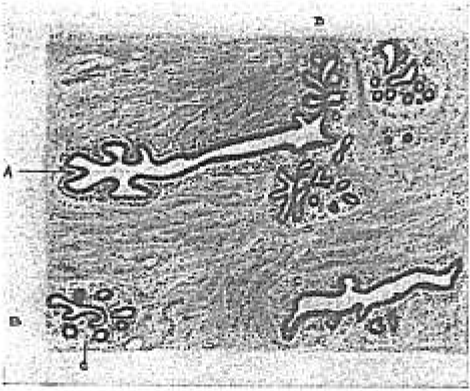

Fig. 3.—Case II. *A*, zone of active proliferation of stroma cells; *B*, group of characteristic end-sacs—virgin type; *C*, mantles of loose tissue containing blue-staining fluid. (Zeiss ocular 2, objective AA.)

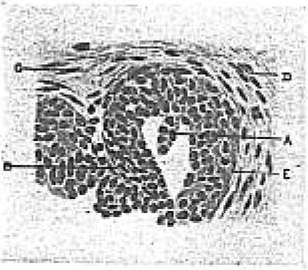

Fig. 4.—Case II. Shows true epithelial proliferation *A*, and papillary invaginations in a duct *B*. *C* shows the character of the blue-staining periglandular mantle. *D*, young connective cells. *E*, basement structure. (Zeiss ocular 4, objective DD.)

cells. Elastic fibers are absent. The bloodvessels are full of blood, and many show in their vicinity a slight sprinkling of leukocytes. The gland ducts contain gray detritus and drops of coagulated fluid, which stain deeply with eosin.

This case differs in no essential from the foregoing except for the larger size of the tumor and for the slight round-cell infiltration. The high-grade development of rudimentary acini is no more than has been observed in normal breasts. Diagnosis, Adenofibroma.

CASE III.—Museum specimen 3877, dated June 13, 1899. Label: Adenofibroma mammæ dextræ.

Clinical History. A tumor developed in the breast of a soldier, aged nineteen years, during the course of a year. The patient was examined by Dr. Eichel, who found in place of the right mamma a disk of firm consistence measuring 7 x 7 x 2 cm. It was not well defined from the surrounding tissues. The nipple was normal, the areola pigmented deeply. The axillary glands were slightly enlarged. The tumor was extirpated, the axilla opened, and the enlarged lymph glands removed.

The tissue of the tumor is dense and white. It sends prolongations into the fat tissue, which in turn projects into the tumor. Examination of the cut surface, which is of a translucent gray-white color, reveals irregularly distributed linear, y-, or glove-shaped flecks of yellowish color corresponding to gland structures.

Microscopically fibrous tissue predominates to a greater extent than in either of the foregoing cases. It is of uniform consistence throughout and sparingly beset with thin, narrow nuclei. Bloodvessels are small and few in number. The glandular parts consist mainly of long dilated ducts branched dichotomously. Occasionally they show lateral twigs. End-sacs occur in groups of only two to four. The papillary structures described in Cases I and II are less marked. Fat is scarce, elastic tissue absent. Scatterings of leukocytes occur in several places. The lymph glands show areas of hyperplasia.

In this case the patient's age is the same as in Cases I and II. While there is no specific history of traumatism, it is not at all improbable that such had occurred, since a tightly clothed soldier in the course of drill is likely to rub or bruise the chest. The sharp circumscription of Cases I and II is lacking, nor is the stroma so active nor the epithelial changes so marked. There is, moreover, a diffuse leukocytic infiltration, while the axillary glands examined showed hyperplasic areas.

Another case, with no clinical history available, but, so far as ascertainable, like the last, may be introduced here and discussed along with it.

CASE IV.—Museum specimen 3925. Male, aged eighteen years. Dated, June 11, 1905: labelled, Adenofibroma mammæ. The specimen consists of an ellipse of skin, including a prominent nipple with a pigmented areola. Beneath the nipple is an ill-defined, tough, whitish mass, which shows under the microscope the same structures as Case III.

Such cases as these (III and IV) differ less markedly from inflammatory processes than do such cases as I and II. Morphologically they stand on the dividing line between inflammation and tumor. They are entirely analogous to the more diffuse adenofibroma-like growths which occur at various times of life in the female breast. The completeness of the series of forms intermediate between inflammation and tumor in the female breast has even been made the basis for the view that direct metamorphosis of fixed tissue cells into tumor cells may occur (Fabian). This view is only quoted to illustrate how many the intermediate forms are, and to point out that in the male breast also we should expect to find a series of tumor-like growths, some showing more, some less, resemblance to pure inflammation, on the one hand, or to adenofibroma, on the other. Such cases as the foregoing are taken as evidence that such a series does exist in males as in the other sex. They throw no new light on the real nature of such.

The four cases so far described occurred in youth, and seem to fall into two groups, two sharply defined tumors, two ill-defined, the former associated with no history of traumatism, the latter perhaps traumatic. The two following cases are of frankly post-traumatic enlargements in adult breasts and seem to resemble Cases III and IV rather than I and II.

Case V.—Museum preparation 3926. Male, aged fifty-six years.

Clinical History. Nine months ago patient fell, striking against the left breast, after which a tumor developed very slowly. Lately it has shown a more rapid growth. October 11, 1898, extirpation by Dr. Lange, of Strassburg, who found the mamma represented by a tumor the size of a hen's egg, not sharply defined from the surrounding tissues. The nipple was prominent and adherent.

The tissue is a dense yellowish mass 4.5 x 2 x 2 cm., which blends intimately with the fat tissue surrounding it. The cut surface shows trabecular markings, the interspaces between which are of darker color and irregular shape.

Microscopic Examination. Dense connective tissue stroma predominates. It is fairly vascular and beset with numerous elongated but not extremely thin nuclei. Gland elements occur as ducts and terminals, as described in Cases I to IV, varying according to the region from which sections come. They are enveloped in broad mantels of loose meshed tissue composed of narrow spindle cells with fibrous extremities, in the interspaces between which, especially near the basement membrane, young connective tissue cells occur. The whole mesh also contains the blue-staining substance described in Case I. Fat tissue is seen in the dense tissues in moderate amounts, especially near the periphery, where it occurs in large islands. Toward the centre one sees only single fat cells or small groups of them. The glandular parts correspond closely to those of Cases I, II, and IV. Elastic tissue is lacking. A few scatterings of leukocytes occur.

CASE VI.—Johann S., aged forty-two years, has noticed a tumor in the left breast since a fall three months ago, in which the breast was bruised. It has grown a little ever since. The patient is otherwise normal, of strong build, and decided masculine habitus. Examination reveals a palm-sized tumor, which is freely movable, on the deep tissues and under the skin. The nipple and areola look large, but are not adherent. May 7, 1907, extirpation. Healing.

The tissue sent to the laboratory consists of an ellipse of skin containing nipple and areola, both of which are prominent but not fixed to the mass which lies below. Under the skin is a piece of tissue 8 cm. wide and 5 cm. thick, in the centre of which is an indurated mass corresponding to the mammary gland. The latter blends all around with the fat tissue. It is firm and consists mainly of fibrous tissue enclosing elongated, semitransparent, colloid-like areas. In the centres of these areas the gland ducts are visible as clefts, or punctate orifices which can be sounded with a bristle. Microscopically, the findings are essentially the same as in Cases III and IV.

In their lack of circumscription these two cases (V and VI) resemble the two preceding cases (III and IV). The only difference between them and Cases III and IV is that the latter occurred earlier in life, while their histories fail to mention the occurrence or non-occurrence of traumatism as an exciting cause, while Cases V and VI arose in advanced life as a result of definite injury. Probably Cases III, IV, V, and VI all belong to the same category, that is, the post-traumatic enlargement just discussed.

These cases differ from adenofibromas like Cases I and II in that the latter began spontaneously as affections which, seen early, would have been called "adolescent mastitis," and developed into sharply defined disk-like tumors.

Consideration of these cases in conjunction with case reports in the literature suggests the view that such sharply defined adenofibromas as Cases I and II always originate in this same way, whereas the ill-defined less certainly newgrowth-like enlargements are frequently a result of traumatism. The sharply defined growths are closely analogous to the painful adenofibromas which occur in young female breasts, which it may be incidentally noted, also frequently begin at about the time of puberty as a result of an affection resembling in all ways "adolescent mastitis." Jopson, Speese, and White have recently noted the relatively great frequency of fibro-epithelial enlargements of the breasts of children at the time of puberty as against other periods in both sexes. The ill-defined growths are analogous in every way to non-malignant indurations which occur in adult, less often in young, female breasts. Both can be looked upon, however, as adenofibromas because of their characteristic structure and progressive growth.

The last case, an example of gynecomastia, is here recorded because reports are still needed definitely to establish the nature of this rare affection. Stieda's two cases in 1895, with six more collected by him from the literature, form the bulk of what is known concerning the histology of the genuine affection. It also offers favorable opportunity for direct comparison of this process with the other cases of the adenofibroma-like group herein described.

CASE VII.—Museum specimen 3359, from the Pathologic-Anatomical Institute. Labelled Hyperplasia mammæ.

Autopsy protocol, November 17, 1894; male, aged fifty-nine years. Cause of death, cirrhosis of liver; also, hypertrichosis and enlargement of both mammæ. The specimen consists of an ellipse of skin including the areola 2.5 to 3 cm. in diameter, and a prominent nipple 3 mm. thick. Around the edge of the areola is a growth of long, coarse hairs. Under the skin is a mass of fat tissue including a gland 6 x 7 x 1.5 cm. not more sharply defined from the surroundings than a normal gland. Its consistence is much less firm than that of Cases I to VI. More cannot be said, owing to the preserving fluid.

Microscopic sections show even to the naked eye a light loose stroma especially marked in the deeper parts of the gland where the ducts bifurcate, so that the peripheral branches of the glandular elements seem to be supported in a light mesh. Under the microscope the relatively dense stroma directly under the nipple is found to consist of wavy bundles of coarse fibers with scanty numbers of long thin nuclei and few bloodvessels. Deeper down such stroma occurs only in trabecular strands, between which, and hence enclosing the gland-parts proper, are areas of very loose fibrous tissue provided with very few nuclei. The whole is more lightly built than the normal breast of a fifteen-year-old boy, pictured in Fig. 1. The ducts show one to four layers of low columnar or polygonal epithelial cells resting on the basement membrane. There are none of the epithelial prominences described in Cases I to VI, nor any invaginations of the duct walls into the lumens comparable to papillæ. Fat is seen in patches lying parallel to the course of the fiber bundles, much more plentiful peripherally than in the centre of the gland. No leukocytes are found.

This specimen differs from the normal only as regards gross measurements, and the texture of its stroma. The latter may depend on the different ages of the subjects compared. The differences between this case and Cases I to VI are essentially the same as the differences between the normal gland and Cases I to VI. These findings are virtually in accord with those of Israel, Scheiber, Stieda, and Volkmann. They confirm the view that gynecomastia is simply hypertrophy.

SUMMARY. Seven cases of non-malignant enlargement of the male breast are reported, affording opportunity for a comparative study of the members of a rather rare and little studied group of affections. Six of the cases are adenofibromas as here interpreted, but they admit of division into two groups:

1. Sharply circumscribed, firm, dense tumors, which arise without traumatism in the breasts of young men, run a painful clinical course, and show under the microscope little or no evidence of inflammation, but all the characteristics of ordinary adenofibromas, such as may occur in the breasts of young women, and to which they are here looked upon as analogous. Cases I and II are of this type.
2. Diffuse or ill-defined growths which may occur at any age as a result of traumatism. Microscopically, these enlargements have virtually the same structure as those of Group I. Signs of inflammation are more in evidence, however, so that their differentiation from chronic inflammation may not be easy (Cases III to VI inclusive). They are here called adenofibromas, because of their progressive growth and microscopic structure. This group corresponds to the "traumatic indurations" of some writers.

Cases like I and II are rare. Cases of the type of V and VI are probably more common than is generally supposed. The early stages of cases such as I and II closely correspond to the disease of problematic nature and unrecorded histology known as "adolescent mastitis." Case I in particular with its small disk-like tumors showed all of the characteristics which have been assigned to this affection.

What the relationship is between adolescent mastitis, so-called, and adenofibromas cannot be settled until histological examinations of the tissue in the former disease have been made. Certainly a close relationship exists between adolescent mastitis and tumors such as are included in Group I. Probably adolescent mastitis is a separate affection, as a sequel to which adenofibroma may develop in exceptional instances. Nearly all cases of sharply circumscribed adenofibromas of the male breast heretofore described have developed in youth in the course of what appeared to be "adolescent mastitis." Further study of this affection is needed. Case VII is an example of gynecomastia. Its histological structure is simply that of an hypertrophy which confirms the few exsisting reports on the histology of genuine unmixed examples of this rare condition. The term gynecomastia might well be dropped in favor of hypertrophy.